Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/pft4fn86

A STUDY OF SUSPECTED CASES OF FOREIGN BODIES ASPIRATION IN TRACHEOBRONCHIAL TREE IN PEDIATRIC AGE GROUP

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ABSTRACT:-
Foreign body aspiration (FBA) is a common and potentially life-threatening emergency in pediatric population. This study aimed to evaluate the clinical profile, diagnostic approach, and outcomes of suspected tracheobronchial foreign bodies in the pediatric age group. Children presenting with sudden onset cough, choking, wheeze, or unexplained respiratory distress were assessed through detailed history, clinical examination, radiological investigations, and rigid bronchoscopy. Most cases occurred in children under five years, with a male predominance. Sudden cough and choking were the most frequent presenting symptoms. Radiological findings were variable, with some showing collapse or hyperinflation, while others appeared normal. Rigid bronchoscopy served as both diagnostic and therapeutic, successfully retrieving organic foreign bodies such as peanuts and seeds in the majority of cases. Early recognition and timely bronchoscopic intervention resulted in favorable outcomes with minimal complications. Preventive measures and parental education remain essential.

Keywords- foreign body aspiration, airway obstruction, radiological investigation, rigid bronchoscopy

INTRODUCTION:-

Foreign body aspiration (FBA) is a common pediatric emergency and an important cause of morbidity and mortality in children, especially those under five years of age due to their exploratory behavior, frequent use of small object like toys[1], mouthing and narrow airway anatomy.

Clinical presentation may include sudden cough, wheeze, stridor, or respiratory distress, while severe cases may lead to cyanosis or unconsciousness. Since these symptoms can mimic other respiratory infections and radiological findings may be inconclusive, diagnosis is often delayed. Prompt suspicion and timely bronchoscopic intervention are crucial to prevent complications such as recurrent infections, atelectasis, or bronchiectasis.

This study evaluates the clinical profile, diagnostic challenges, and outcomes of suspected tracheobronchial foreign body aspiration in children at a tertiary care center, with emphasis on the importance of early recognition and interventional strategies as well as diagnostic and therapeutic approaches of bronchoscopy[2]

Aim and Objectives-

1.The study aims to evaluate the prevalence, clinical presentation, diagnostic challenges, and outcomes of foreign body aspiration.
2.Highlight the role of bronchoscopy as a key diagnostic and therapeutic tool.
3.Assess age and gender distribution, common types, and sites of impaction.
4.Analyze patterns of presentation, investigations, and management strategies.

MATERIALS AND METHODS –

Study period: January 2023 to December 2024
Study place: ENT department of P.D.U. medical college Rajkot.
Study population: 50

Inclusion criteria -

1.Children up to 12 years with strong history of foreign body aspiration.
2.Sudden onset respiratory symptoms such as distress, stridor, or cough.

Exclusion Criteria-

1.Age >12 years.
2.Congenital airway anomalies (e.g., laryngeal web, stenosis).
3.Patients unwilling to participate.

SURGICAL TECHNIQUE-

Rigid bronchoscopy was performed under general anesthesia with controlled ventilation. After preoperative assessment and optimization, the child was positioned supine with neck slightly extended. A rigid ventilating bronchoscope of appropriate size was introduced under direct vision. The tracheobronchial tree was systematically examined, starting from the trachea and extending into both bronchi.

Foreign bodies were identified and removed using suitable instruments such as optical forceps, peanut forceps, or suction catheters. Care was taken to avoid fragmentation, displacement, or mucosal trauma during retrieval. In cases of impacted foreign bodies, gentle manipulation with repeated attempts was performed under continuous monitoring of oxygen saturation and hemodynamics.

POST-OP MANAGEMENT -

Continuous monitoring of airway patency, oxygen saturation, and vital signs was ensured. Humidified oxygen, nebulization, and intravenous fluids, antibiotics and steroids were administered as required.

RESULTS-

Most cases of foreign body aspiration occurred in children aged 6 months to 3 years (68%), with the youngest being 5 months and the oldest 12 years, that attributing this to lack of molars, high laryngeal position, and exploratory behavior. A male predominance was noted (60%), particularly among children from low socioeconomic backgrounds (88%). The majority presented within hours to a week of aspiration, with cough (96%) and respiratory distress (90%) being the most common symptoms. Radiological findings varied, with 24% showing clear fields; however, obstructive emphysematous changes (44%) were the most frequent abnormalities. Most foreign bodies were organic (83%), primarily groundnuts (45%), and commonly lodged in the right bronchus (43%). Rigid bronchoscopy was diagnostic and therapeutic, with successful retrieval in 84% of cases. Early intervention within 24 hours significantly reduced complications, shortened hospital stays, and improved outcomes, highlighting the importance of timely management and follow-up.

CLASSICAL TRIAD strongly suggestive of foreign body aspiration includes-

1. Cough- most common initial symptom.
2. Reduced air entry in either lung on auscultation.
3. Radiological obstructive changes - including obstructive emphysema and collapse.

RADIOLOGICAL CHANGES OBSERVE IN STUDY :

RADIOLOGICAL CHANGES IN CHEST X-RAY	NO. OF CASES	PERCENTAGE
FOREIGN BODY SEEN (RADIOPAQUE)	2	4
OBSTRUCTIVE COMPLETE COLLAPSE CHANGES	3	6
OBSTRUCTIVE PARTIAL COLLAPSE CHANGES	6	12
CHANGES OF PNEUMONITIS	5	10
OBSTRUCTIVE EMPHYSEMATOUS CHANGES	22	44
BILATERAL LUNG FIELD APPEAR CLEAR	12	24

Radiology is a key diagnostic tool[3] in suspected foreign body aspiration, though 96% are radiolucent and 24% chest X-rays inconclusive; hence, a negative film does not exclude diagnosis[4][5].In our study, obstructive emphysema (44%).Findings included mediastinal shift, lung hyperlucency, diaphragmatic changes, and intercostal space alterations, while collapse showed opposite radiographic features.

FIG : Left lung collapse

INDICATION OF CT SCAN WITH VIRTUAL BRONCHOSCOPY IN SUSPECTED CASES OF FOREIGN BODY ASPIRATION -

1. Normal/inconclusive X-ray with strong suspicion (cough, stridor, wheeze).
2. Precise localization before bronchoscopy to ease removal and reduce anesthesia time.
3.Assessing size, shape, nature, and location of foreign body.
4.High-risk anesthesia cases with unclear X-ray findings.
5.Persistent respiratory infection despite treatment.
6.Suspected residual/missed foreign body after bronchoscopy with ongoing symptoms.

FOREIGN BODY FOUND IN THIS STUDY:

	Nature of foreign body	**No. Of cases**	**% of cases**
A.	**VEGETATIVE**	35	83.3
	Groundnut	19	45.2
	Betelnut	7	16.7
	Coconut piece	3	7.14
	Tamarind seed	2	4.8
	Custart apple seed	2	4.8
	Bengal gram	2	4.8
B.	**NON -VEGETATIVE**	7	16.7
	Stone piece	2	4.8
	Broken glass piece	1	2.4
	Metal piece(Silver)	1	2.4
	Nail	1	2.4
	Plastic whistle	1	2.4
	Plastic cap of pen	1	2.4

In this study, most foreign bodies were vegetative (83.3%), with only 16.7% non-vegetative. Groundnuts were the most common (45.2%), followed by betelnuts (16.7%). Food items, especially Bengal grams, were frequent culprits.

FIG : Groundnut removed from left main bronchus

FIG : Plastic whistle removed

SITE OF FOREIGN BODY LODGMENT IN THIS STUDY-

SITE	PRESENT STUDY	
	No. Of cases	Percentage
Larynx	3	7.14
Trachea	8	19.05
Rt bronchus	18	42.86
Lt bronchus	13	30.95

Right-sided preponderance of foreign body lodgement occurs because the [7]right main bronchus is wider, more vertical, and deviates less from the tracheal axis. The carina lies slightly left of midline, directing foreign bodies towards the right. Additionally, a greater volume of inspired air enters the right bronchus, making it the most common site, followed by the left bronchus.

ROLE OF EARLY INTERVENTION OF RIGID BRONCHOSCOPY IN STUDY OF FOREIGN BODY ASPIRATION-

PARAMETER	EARLY INTERVENTION (≤24 hours)	LATE INTERVENTION(>24 hours)	REMARKS
No. Of cases	27	23	Early intervention in 54% of cases
Complications observed	Mild airway edema, transient hypoxia, bronchospasm,minor bleeding	Severe airway edema, atelectasis, pneumonia, granulation formation, severe hypoxia	Less complication and decreased severity in early intervention
Duration of post operative recovery period(days)	Minimal 2-3	Minimal 5-7	Significantly shorter in early group
Outcome (complete recovery)	100%	100%	Delayed intervention cases require more constant post op monitoring

Early rigid bronchoscopy within 24 hours in suspected pediatric foreign body aspiration is life-saving, restoring airway patency and preventing hypoxia, respiratory distress, or death. Prompt removal reduces inflammation, infection, granulation, and long-term complications, while improving safety, outcomes, and hospital efficiency. Delays increase morbidity and procedural risk. Rigid bronchoscopy remains the gold standard for diagnosis and management, with strong evidence supporting its early use.[10]

COMPLICATIONS -

Complications associated with rigid bronchoscopy are usually uncommon if procedure is performed with the correct indication[8]In this study of 50 cases, 6 developed medical complications such as persistent bradycardia, dyspnea, and pulmonary edema, all managed successfully with pediatric intensive care. Though rigid bronchoscopy carries surgical risks like airway trauma, pneumothorax, dental injury, and late tracheal stenosis[9] no surgical complications occurred in our series.

CONCLUSIONS -

In this study, 68% of cases occurred in children aged 6 months to 3 years, with poor socio-economic background contributory (88%) and a male predominance[6] (60%). Vegetative foreign bodies were most common (83.3%), with groundnuts leading (45.2%). Non-radiopaque objects (95.2%) predominated, and the right bronchial tree was more often affected (42.9%) than the left (30.9%). The triad of cough, reduced air entry, and radiological obstruction was a key diagnostic clue. Rigid bronchoscopy under general anesthesia proved the safest and most effective treatment, particularly when performed early, with successful outcomes ensured by asepsis, skilled ENT surgeons, and adequate facilities.

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